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Unlocking Potential: An Engaging Learning Game for Underprivileged Kids

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Abstract

Learning is the foundation of development, potential, and empowerment. However, hundreds of millions of children, especially marginalized children, are being denied access to even the most basic forms of education. Without foundational skills in reading and learning, they remain perpetually handicapped in future job opportunities, socio-economic mobility, and personal growth. Even when education is available, many children lack supporting institutions that enable them to pursue their studies. Financial stress often pushes them toward work instead of education, leading to dropouts, especially in disadvantaged communities. This study emphasizes the importance of basic education as a human right rather than an entitlement, highlighting the need for inclusive and engaging learning solutions specifically designed for children with limited access to education. By incorporating game-based learning and interactive teaching methods, this research aims to explore how innovative approaches can make education more accessible, appealing, and effective. Through guided play and experiential learning, we can bridge gaps in literacy and foundational skills, giving all children the opportunity to learn, grow, and aspire despite socio-economic barriers. "Education is the great equalizer, empowering individuals and propelling society forward. However, millions of children, particularly those in economically deprived situations, miss out on basic education. Limited resources, insufficient infrastructure, and socio-economic constraints hinder their access to fundamental skills. Game-based learning offers a promising solution, making education interactive, inclusive, and engaging. By incorporating play into learning, children can gain literacy, creativity, and essential skills. This approach can be especially helpful for children at risk of dropping out or those with limited access to traditional schooling. Our study aims to make learning a reality for every child, regardless of background or economic difficulties."

Keywords: Education, Game-Based Learning, Literacy, Socioeconomic Barriers, Accessibility.

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Introduction

Education extends beyond a mere academic path; it acts as a powerful catalyst that cultivates self-assurance, personal development, and enduring societal progress.(11,12) It provides individuals not only with scholarly understanding but also with crucial life competencies, including proper etiquette, strong communication skills, emotional management, and problem-solving capabilities.(8,9) These skills play a vital role in developing responsible, compassionate, and self-sufficient members of society. (2,11) An educated populace contributes to economic advancement, social stability, and national strength, making education a vital resource for sustainable development rather than merely a personal gain.(2,11) Nevertheless, in India, countless underprivileged children encounter significant hurdles in accessing even basic education. Deep-seated systemic disparities—stemming from poverty, caste discrimination, and rigid societal norms—pose substantial challenges, particularly in rural and semi-urban areas. Communities on the margins, such as Scheduled Castes (SC) and Scheduled Tribes (ST),

frequently face unequal educational prospects, a consequence of long-term social neglect and insufficient institutional backing. Additionally, gender bias complicates the situation; many young girls are hindered from seeking education due to domestic responsibilities or cultural discouragement. Moreover, the infrastructure and quality of public educational institutions are drastically insufficient. (11,12) Numerous schools are devoid of clean restrooms, adequate playgrounds, necessary teaching resources, and qualified instructors—conditions that severely diminish motivation and learning effectiveness. The digital divide further worsens inequality, restricting access to e-learning tools and innovative platforms that could enhance educational experiences(6) Traditional educational methods are often rigid, uninspiring, and detached from the real-life contexts children encounter at home or in their communities. When students cannot connect with the material being taught or when their emotional and practical needs are overlooked, the relevance of the education system diminishes. This emotional disconnect, coupled with a lack of engagement, contributes to alarming dropout rates in India—12.6% at the secondary level—many students leaving school due to disinterest or the pressure to contribute financially. (3) In light of these complex obstacles, there exists a pressing need to rethink the delivery of education, particularly for children in marginalized and economically disadvantaged situations. Gamification has surfaced as a potential solution, turning learning into an interactive, enjoyable, and psychologically engaging journey.(8,6) Educational tools like Duolingo, Prodigy, Class craft, and Folded have successfully illustrated how game principles can enhance engagement, bolster knowledge retention, and support emotional development.

"Functions are working in the market - Gamification: The Definitive Engagement Tool in Education."

Traditional learning is transformed by gamified learning, rendering knowledge acquisition immersive, adaptive, and reward-oriented. A number of reputable gamified platforms have clearly illustrated ways in which engagement-driven models improve retention, inspiring interactive approaches designed for young learners.

- Duolingo makes learning a language fun by tracking progress, having interactive levels, and awards that motivate repeated daily practice.

- Prodigy reimagines learning math as an adventure game where students complete math problems as quests and receive points for advancing.

- Classcraft brings role-playing elements into regular education, encouraging cooperation and problem-solving abilities through learning challenges.

- Foldit engages learners in authentic, real-world scientific problem-solving with interactive puzzles and has proven that learning via visualization works.

Above applications validate that gamification enhances curiosity, motivation, and retention of lessons across most subject areas. Shaping equivalent engagement strategies into an educational system utilizing cards makes schooling more attainable and desirable to early-age learners aged 6-9 years.

Through experiential design grounded in child psychology, these platforms create a connection between play and education. In response to these urgent needs, this research introduces a card-based educational game that combines emotional growth with academic instruction. Designed for children from underserved communities, the game aims to foster good manners, emotional intelligence, and foundational academic skills—through story-driven play, peer collaboration, and real-life relevance. (8,9) By merging playful elements with empathetic design, the game motivates children to learn beyond the textbook, equipping them with essential life skills. Ultimately, it aspires to revive the joy of learning, enhance school retention, and contribute to the formation of a generation of resilient,

emotionally intelligent, and empowered learners. (3,8)

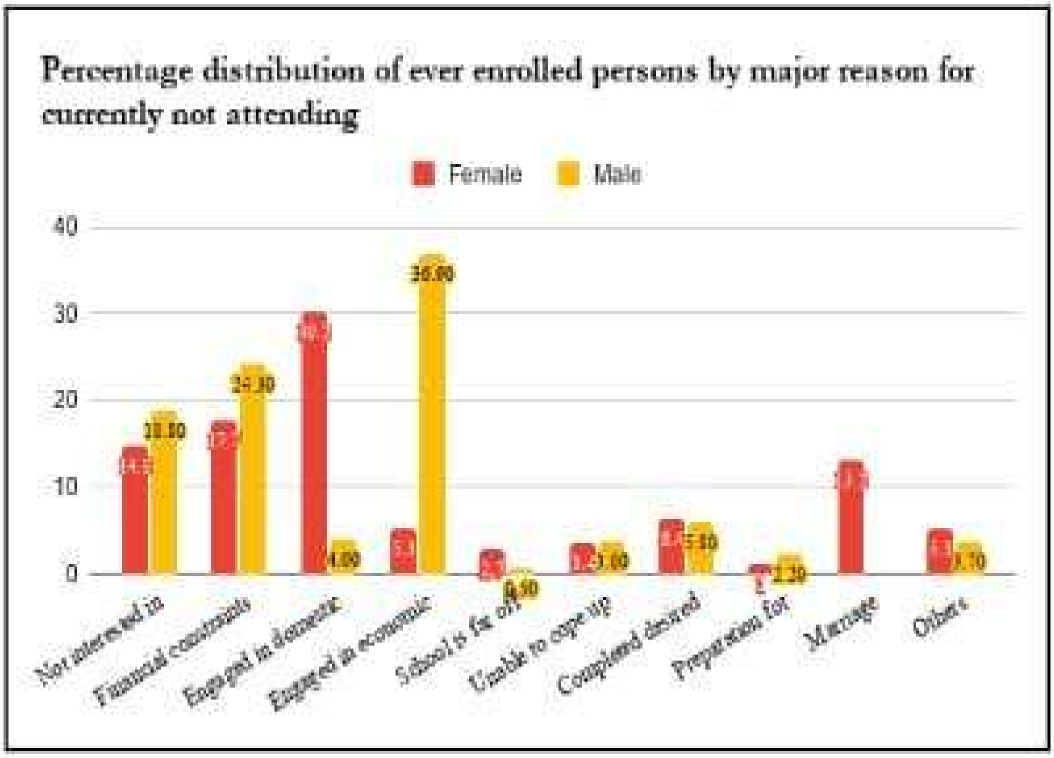

Fig.1- Reasons of absenteeism among Enrolled students

Objective-

Numerous children encounter restricted educational prospects due to financial difficulties that force them into work from a young age. Public schools, which are the main educational institutions for underserved communities, frequently suffer from a lack of resources, being devoid of basic facilities such as sanitary restrooms and vital teaching supplies. Furthermore, inflexible and antiquated teaching practices struggle to effectively engage students, resulting in learning experiences that feel tedious and disconnected from their real-life experiences. These factors together lead to low student retention and a decreased belief in the significance of education in influencing a child's future.

Psychology of Children & Their Connection with Games

Kids have an innate tendency to engage in learning through play, allowing them to explore, take risks, and enhance their problem-solving abilities in a hands-on setting. Play promotes collaboration, cognitive growth, emotional awareness, and social abilities, leading to improved understanding and memory of information. The competitive elements of games foster involvement, encouraging children to advance and refine their skills.

The Need for a Gamified Educational Model

Gamification connects conventional teaching techniques with engaging learning experiences. By implementing a system of rewards, games can keep students engaged, transforming learning into a more enjoyable and meaningful activity. Interactive frameworks facilitate practical learning, allowing children to understand concepts beyond

what is found in textbooks while promoting critical thinking and creativity.

Proposed Card-Based Learning Game

This study focuses on designing a card game tailored for children aged 6 to 9, integrating:

•Basic Math – Fundamental numeracy skills to strengthen logical reasoning.

•Good Habits – Interactive lessons on manners and ethical behaviour.

•Emotional Awareness – Teaching children to recognize, express, and manage emotions.

Selecting the 6-9 age group is intentional, as this period forms the foundation of a child's learning journey. If a child develops an interest early, they are less likely to drop out, even if external financial pressures exist.

Assessing the Effectiveness of Gamification

Gamification can enhance student retention and elevate motivation, providing:

• Enhanced involvement – Transforming learning into an enjoyable and engaging experience.

• Better academic results – Aiding students in effectively grasping concepts.

• Lower dropout rates – Keeping students enrolled by making education relevant.

Practical Solutions for Implementation

•Government schools and educational institutions can adopt offline gamified models, including:

•Interactive classroom activities replace rigid teaching methods.

•Physical game-based learning tools for low-resource areas.

•Teacher training programs focused on play-based strategies.

By integrating game mechanics with learning, education can become more accessible, engaging, and effective for marginalized children, ensuring higher retention and long-term academic success.

It is a human right to be educated, but economic difficulties, parental support, and inherent problems usually render it impossible for poor children. Most families live on the day-to-day wage, where survival takes priority over education, causing children to go to work instead. Parents, particularly illiterate ones, also fail to see its long-term benefit, making school attendance even less possible for children. Also, infrastructure deficits like remote schools and complex entry requirements keep students out, particularly in the countryside. Apart from financial struggles and bureaucratic barriers, conventional teaching practices lead to disengagement among young students. Most classrooms are based on strict, lecture-driven instruction that does not stimulate engagement, discovery, or imagination. Whereas passive learning can be effective for some subjects, children, especially those in the 6-9 age range, need interactive, participatory experiences to develop curiosity and sustained attention. Traditional education tends to neglect diverse learning styles, resulting in memorization over understanding. Without play-based learning methods, children cannot make genuine connections with education, and this leads to high dropout rates. "While Visiting Village of Bidholi, Which is based in Dehradun, a five-year-old boy and a ten-year-old girl from Bihar spoke about their experiences, showing the harsh realities that many migrant children go through.

Their parents had migrated for work, leaving them out of school, though they wanted to study and dreamt of a better future. Discussions with their families brought to light a persistent challenge-daily wages create an instant feeling of security, whereas education lacks apparent short-term rewards." Without tangible examples of how education changes lives, families are stuck in the poverty trap, with survival taking precedence over development. If kids from disadvantaged communities had positive role models showing them the ultimate outcome of education, attitudes would change, making school a simple path to empowerment instead of an optional endeavour. To maintain interest among children between 6 and 9, schooling needs to become an enriching experience instead of something compulsory. Game-based learning, one of the most effective methods to make this happen, presents learning as a fun, engaging, and interactive experience. In contrast to traditional approaches that depend on fixed structures, games incorporate creativity, critical thinking, and discovery, engaging children in the learning process. Through workshops, storytelling, posters, origami, and counselling sessions, teachers can turn classrooms into vibrant spaces that promote engagement over passive knowledge absorption. Card games are a great game-based tool, especially for low-resource settings, since they are portable and accessible. With reward-based mechanics, kids monitor their progress, encouraging their learning experience in a fun manner. Sequential gameplay enables kids to construct knowledge step by step, while instant rewards give encouragement to keep following their learning journey. Because card games are tangible and simple to use, they can be utilized both in the classroom and at home, giving a consistent learning experience outside of the classroom. Transitioning from conventional models to learning through games ensures that education is always accessible, enjoyable, and effective for children confronting socio-economic struggles. Through the provision of interactive learning approaches, children remain committed to learning, lowering dropout rates and enabling them to view learning as a journey toward possibility instead of mere obligation. Education need not merely be attendance—it needs to be active participation, change, and sustained achievement.

This research utilizes a mixed-methods approach, combining both quantitative and qualitative strategies to examine the emotional and educational requirements of disadvantaged children. The methodology is grounded in principles of participatory and empathetic design, placing the experiences, actions, and voices of the children at the forefront of the research process.

To steer the design journey, the Double Diamond Process was applied, consisting of four essential stages: Discover, Define, Develop, and Deliver. During the Discover stage, preliminary research was undertaken through academic literature, online sources, and visits to schools that cater to marginalized communities. This process helped pinpoint key issues related to engagement, retention, and emotional connection within current educational frameworks. The Define stage involved synthesizing the findings using techniques such as mind mapping, empathy mapping, and the creation of user personas to clarify the problem space and grasp the varied emotional and cognitive profiles of children across multiple age groups and IQ ranges. In the Develop stage, brainstorming and reverse brainstorming techniques were utilized to generate possible solutions. These ideas were later refined and focused during the Deliver stage, resulting in the development of a card-based educational game that addresses the emotional and academic needs of the targeted demographic.

For the quantitative aspect, surveys and questionnaires were crafted using straightforward language and open-ended questions to ensure accessibility. The questions were tailored for different age brackets to gather a spectrum of perspectives and emotional reactions. Visits to several schools facilitated direct engagement with both children and educators, enhancing the data with real-world observations and insights.

The qualitative aspect concentrated on visual and experiential design. Software such as Canva, Adobe Illustrator, and Photoshop was employed to prototype game components and investigate age-appropriate visual styles. Further research into existing educational games was conducted to ensure that the final design aligned with the developmental needs and engagement techniques suitable for the specified age group. In summary, this methodology merges academic integrity with emotional insight, guaranteeing that the ultimate solution is not only supported by evidence but also profoundly empathetic and contextually relevant.

Education is the bedrock of individual and societal advancement, but millions of children living in marginalized

groups are unable to access quality education because of failures in the system. Most of these children risk being pushed out of school by poor infrastructure, old-fashioned methods of teaching, lack of parental awareness, and inefficient government initiatives. Conventional teaching approaches tend to fall short in holding children's attention, resulting in poor retention levels and learner disengagement. To counteract this, gamification presents a revolutionary solution by making learning an engaging, interactive, and curiosity-based experience for young minds. The initial years of schooling are essential for mental development, and encouraging interest during this phase can establish a child's lifelong love for learning. Gamification makes education more accessible, fun, and enriching to bridge the gap between dry teaching and engaging learning, maintaining the interest of children to learn further.

Result and discussions-

The study resulted in the creation of a card-based educational game aimed at children aged 6 to 9 from disadvantaged backgrounds, focusing on mathematical reasoning, social skills, and emotional intelligence. Field observations and user testing indicated that children reacted positively to interactive components like singing, dancing, role-playing, and storytelling, which enhanced their verbal confidence, emotional expression, and teamwork. The game's adventure-themed progression motivated task completion and kept children engaged, confirming that gamification is an effective approach for enhancing retention and motivation.(1,2) These results are consistent with successful platforms such as Duolingo and Prodigy, illustrating that reward-based, experiential learning can turn traditional classrooms into supportive, curiosity-driven environments(3). The game also tackles systemic issues like outdated infrastructure, passive teaching techniques, and insufficient parental involvement by providing a low-tech, scalable, and enjoyable learning model that connects academic content with emotional development(4,5,6).

• Even though education is a fundamental right, countless children still do not have access to quality learning opportunities. In underprivileged areas, traditional teaching approaches—often inflexible and uninspiring—along with poor infrastructure and limited institutional support, contribute to academic disengagement and elevated dropout rates. These systemic challenges hinder children from experiencing education as a meaningful and empowering journey.

• Gamification has emerged as an effective solution to these issues. It transforms learning into a rewarding and motivating venture, prompting students to engage actively and explore. A well-structured, stimulating environment nurtures curiosity and enhances long-term memory retention. To realize this, schools must invest in improved facilities, train teachers in interactive and student-focused methods, and encourage active parental engagement.

• Dynamic learning models—such as smart classrooms, experiential learning experiences, and gamified education—provide practical, application-oriented experiences that keep students interested. Platforms like Duolingo, Prodigy, Classcraft, and Foldit have shown how gamified learning can enhance critical thinking, problem-solving, and knowledge retention. By incorporating these effective strategies into formal education, educators can reimagine traditional learning and improve student achievements.

Conclusions-

Gamification presents a compelling method to transform learning for disadvantaged children, incorporating elements of play alongside emotional and educational development. This card game addresses systemic issues—such as traditional teaching methods and scarce resources—by making learning enjoyable, interactive, and accessible. Drawing inspiration from platforms like Duolingo and Prodigy, it demonstrates how a reward-based approach can nurture curiosity and relationships. Rather than merely a tool, gamification serves as a connection between engagement and empowerment. Looking ahead, such playful methods should be regarded not as optional,

but as fundamental components of inclusive education.

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